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Influence of Antitobacco Message on Smoking Behavior Among University Students in Bangladesh: A Cross-Sectional Study

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ABSTRACT

Background and Aims: Tobacco consumption continues to be a significant public health issue among university students, highlighting the need for an in-depth analysis of the factors that shape smoking behaviors. This study explores the effects of Antitobacco messaging from various sources—including media, parents, religious institutions, and peers—on the smoking behaviors of students.

Methods: A cross-sectional study employing a quantitative approach was conducted among 632 university students in Bangladesh, selected through a multistage sampling technique. Data were collected using a structured questionnaire developed based on the constructs of the Theory of Planned Behavior following face to face interview. The analysis was carried out using STATA version 18, incorporating both descriptive statistics and logistic regression.

Results: The findings reveal that Antismoking messages often reinforce positive attitude toward smoking cessation among university students. The findings indicate that consistent exposure to these messages' shapes students' subjective norms and attitudes, promoting smoking abstinence, particularly among females. Parental guidance, along with religious messages prevents initiation among non-smokers, whereas peer-led messages have limited effects on students who never smoked. Cessation messages are more effective for females compared to males, while Muslim smokers show a more favorable response to Antitobacco messages, and cessation efforts are more successful in private universities than in public ones. These findings underscore the complexity of smoking behaviors among university students, calling for tailored intervention strategies that consider gender differences, institutional contexts, and the nuanced roles of social influences in tobacco cessation.

Conclusion: This finding should serve as a catalyst for policy-making debates aimed at re-innovating Antismoking messages to motivate university students to quit smoking and achieving a tobacco-free Bangladesh by 2040.

1 | Introduction

Tobacco or smoking is widely recognized as one of the most significant global threats to public health, with multiple adverse risk factors. Recent data indicates that tobacco contributes to

approximately seven million annual deaths, with 1.2 million individuals dying from second-hand smoke exposure, despite not being smokers themselves [1]. Furthermore, the death rate is projected to rise to approximately 8.3 million by 2030 due to tobacco use, accounting for around 10% of total annual deaths [2].

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Tobacco use poses several health risks, including the development of 16 types of cancers (e.g., lung cancer, leukemia, liver cancer, stomach cancer, lip and oral cavity cancer, cervical cancer, and others), five types of cardiovascular diseases (e.g., peripheral artery disease, ischemic heart disease, stroke, and others), as well as lower respiratory tract infections, asthma, and diabetes [3–5]. Conversely, studies have found a higher prevalence of stress, depression, anxiety, and sleep disorders among college and university students attributed to tobacco use [6, 7].

Moreover, the World Health Organization [1] identifies South-east Asia as the region with the highest tobacco consumption rates globally, with approximately 20% of the population engaged in tobacco smoking. This region alone accounts for over 40% of all tobacco-related deaths worldwide. According to the Global Youth Tobacco Survey, Southeast Asia recorded the highest number of adolescent tobacco users globally, with 14.8 million, representing 34% of all users. Notably, the prevalence of tobacco use among students in Bangladesh surpasses that of students in India, Pakistan, Nepal, and Malaysia, and may even exceed that of other South Asian countries [1]. Additionally, literature suggests that middle- and lower-income countries exhibit a higher prevalence of adolescent tobacco users relative to general tobacco users when compared to developed or technologically advanced countries [8]. It is evident from studies that young individuals often develop smoking habits during their university years, with approximately 43% of university students initiating smoking during this period [9, 10].

Bangladesh, as a developing country, is among the largest adult tobacco-consuming nations globally, with approximately 35.3% of the population engaged in tobacco use, where 46% are male, and 25.2% are female [11] (BBS, 2019). Additionally, the tobacco consumption prevalence rate among individuals aged 15 to 24 years in Bangladesh is approximately 17% [11]. Furthermore, peer and group influences are identified as strong determinants for the initiation and continuation of smoking among college and university students in Bangladesh [12, 13]. In the contemporary era, social media serves as a crucial hub for sharing and disseminating information among the younger generation. A study found that around half of the youth population observed tobacco advertisements on social media platforms such as Facebook, YouTube, and Twitter [11]. Tobacco companies strategically leverage these social media platforms to promote their activities, given that approximately 93% of adolescents are actively engaged on social media [14].

Evidence suggests that social messaging plays a critical role in reducing or curbing smoking behavior. Antismoking campaigns disseminated through various mass media, digital platforms, peer groups, and community-based initiatives have demonstrated the potential to encourage gradual behavioral shifts among smokers [15]. Public health campaigns, often employing fear-based imagery (e.g., lung cancer, heart disease, and premature infant births), have been effective in motivating individuals to quit smoking [16] (Davis et al., 2017). Furthermore, Bangladesh became a signatory to the 2003 WHO Framework Convention on Tobacco Control (FCTC) to counter the global tobacco epidemic. In response, the government of Bangladesh has introduced numerous antitobacco initiatives to deter

tobacco usage. These measures include graphical health warnings, increased taxation, prohibitions on smoking in public spaces, educational institutions, and healthcare facilities, along with mass media campaigns against tobacco consumption.

However, to devise effective interventions, it is imperative to comprehend the impact of social messages on smoking behavior among university students. Existing literature has not adequately explored the influence of social messages on smoking behavior among university students in Bangladesh. The objective of this study is to ascertain whether social messaging and other demographic factors significantly impact smoking behavior among university students in Bangladesh.

2 | Materials and Methods

2.1 | Study Design

A cross-sectional research design was adopted to conduct the study. A cross-sectional research design is typically employed when the purpose of the study is to analyze data at a single point in time. This design is often used to assess public health statuses or behaviors, such as smoking habits, to understand their prevalence within different demographic groups at a specific moment.

2.2 | Study Type

The study applied a quantitative approach to measure the influence of antitobacco messages on tobacco consumption behavior among university students in Bangladesh.

2.3 | Study Area

Dhaka, the capital city of Bangladesh, hosts the highest concentration of both public and private higher educational institutions in the country. Given this extensive representation of the student population and the diversity of educational settings, Dhaka was selected as the study area.

2.4 | Settings and Sampling

A multi-stage sampling technique was implemented for collecting primary data from both public and private universities. At first, two clusters (public and private) were made from the pool of higher educational institutions situated in Dhaka. From that pool, random selection technique was followed to choose the educational institutions from where data was collected. The University of Dhaka, the largest public university in the country, served as the representative public university, while private universities such as East West University, Uttara University, and United International University were also included. The study collected data from 632 respondents, with 400 from public universities and 232 from private universities. Given the larger student population and higher accessibility in public universities compared to private universities in Dhaka, this study collected approximately double the number of responses from

public university students. This approach ensured proportional representation, statistical robustness, and the inclusion of diverse socioeconomic backgrounds, which are critical for understanding the dynamics of tobacco consumption among university students. Krejcie and Morgan table of sample size determination was followed to determine the minimal sample size. Training sessions were conducted for enumerators to ensure they thoroughly understood each question, and they personally reached out to respondents to conduct the survey. Each data collection took about 10–15 min per respondent, achieving a 90% response rate.

2.5 | Instrument and Data Collection

The study developed a structured questionnaire to gather data from respondents. The complete questionnaire was divided into five sections with 18 items; the first section included demographic questions; the second section comprised four items on attitudes toward tobacco use; the third section included four items on subjective norms regarding tobacco consumption; and the fourth and fifth sections contained questions about tobacco cessation techniques. The questions were developed after conducting literature review. To ensure the questionnaire was easy to understand for all respondents, it was translated into Bangla. A pilot study was conducted to verify the questionnaire's construct and face validity. Cronbach's alpha was 0.906, indicating a satisfactory level of internal consistency of the items. The data collection period was from February 28, 2024, to April 28, 2024.

2.6 | Dependent and Independent Variable

This study used four different dependent variables to investigate the effect of social messages on the smoking behavior of university students. The first dependent variable is a binary variable of students who quit smoking: Quit Smoking = 1 if the student quit smoking and zero if the student is a current smoker. The second variable is students who have never smoked in their life: Never Smoked = 1 if the student never smoked and zero otherwise. The following variable is the student's Subjective Norm. Subjective norms refer to the individual's beliefs about whether others think they should undertake the action. This variable was derived from the Theory of Planned Behavior (TPB). The Theory of Planned Behavior suggests that perceived social pressure will influence the subjective norm of smoking. The theory suggests that if people around individuals are Antismoking, it will influence the person's subjective view of smoking will also be negative (Dadipoor et al., 2023; Tapera et al., 2020). To study the effect of social messages on influencing subjective norm, a Subjective Norm binary variable was constructed. The Subjective Norm is a binary variable representing whether the student intends to stay away from smoking: Subjective norm = 1 if the student intends to stay away from smoking and zero otherwise. The last variable for analysis was the Attitude, which is also derived from the TPB framework. The Theory of Planned Behavior also suggests that personal evaluation of quitting smoking. If the person believes that quitting smoking leads to

positive outcomes, it will affect their attitude towards smoking (Dadipoor et al., 2023; Tapera et al., 2020). This study investigates whether social messages also influence individuals' personal views. Attitude means an individual's overall assessment of the action. In the analysis, Attitude denotes if the student has confidence in quitting smoking: Attitude = 1 if the student is confident that they can quit smoking and zero otherwise.

The independent variables include the four Antismoking social messages: messages from the Media, Parents, Religious Institutions, and Peers. Each message in the questionnaire was asked with three different levels. Suppose the respondent received the social Antismoking messages, categorized as 'Never,' 'Sometimes,' and 'Always.' In the analysis, each message is separated into two variables according to its frequency as collected using the questionnaire; each message is received sometimes or always. The rationale behind these two intensity variables was to investigate whether higher exposure to these messages has a greater effect on smoking cessation.

Other confounding variables were used to find the true relationship between the dependent variables and Antismoking social messages. The confounding variables were the age of students, the gender of students, the type of university, the religion of students, and the students' marital status.

2.7 | Statistical Methods

The study first uses descriptive statistics to see the frequency of current smokers and never-smokers among university students. This study conducted a cross-sectional analysis using multivariate logistic regression to examine the influence of antitobacco messages on the smoking behavior of university students in Bangladesh. Logistic regression is the best method when the dependent variable is binary, which is the case for all four dependent variables investigated in this study. Logistic regression estimates log-odds, which can be transformed into an Odds ratio. Odds ratios were calculated, and the statistical significance level was reported. The odds ratio for each model assesses the likelihood of different smoking-related outcomes based on exposure to Antismoking messages. Logistic regression does not assume a linear relationship between predictors and the outcome probability and is also flexible with both categorical and continuous predictors (Dey et al., 2025; Zabor et al., 2022). The analysis was completed using STATA 18 statistical software.

Four logistic multivariate regression models were developed to examine the following binary outcome variables:

1. **Quit Smoking:** Whether the student has quit smoking (1 = Yes, 0 = No).
2. **Never Smoked:** Whether the student has never smoked in their life (1 = Yes, 0 = No).
3. **Students intend to stay away from Smoking:** Whether the student intends to stay away from smoking (1 = Yes, 0 = No).

- 4. **Students Attitude towards quit smoking:** Whether the student is confident in their ability to quit smoking (1 = Yes, 0 = No).

The primary independent variables for each model include:

- **Sometimes received Antismoking messages from:**
 - Media
 - Family
 - Religious institutions
 - Peers
- **Always received Antismoking messages from:**
 - Media
 - Family
 - Religious institutions
 - Peers

Each independent variable was coded as a binary indicator, with 1 indicating exposure to the message and 0 otherwise.

We also controlled for several confounding variables, including:

- Age of the students (continuous)
- Gender (Binary: male = 1 or female = 0)
- Type of university (Binary: public = 0 or private = 1)
- Religion (Binary: Muslim = 1, Other = 0)
- Marital status (Binary: Married = 1, Unmarried = 0)

The log-odds of the dependent variables occurring can be shown as

$$\log \left[\frac{P(Y = 1)}{1 - P(Y = 1)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots$$

The β_k are estimated, and a positive value of the coefficients means that X_k increases the probability of $Y = 1$ increases.

Odds ratios were calculated to determine the strength of the association between exposure to Antismoking messages and smoking-related behaviors. In our cases, the model can be expressed as below,

$$P(Y = 1|X_i) = \frac{1}{1 + e^{-(\sum_{i=1} \beta_i X_i)}}$$

Here $P(Y = 1|X_i)$ is the probability that the outcome Y is 1 given the predictors X_i . So, for our first case $Y = 1$ if the student quits smoking and for the second case $Y = 1$ if the student never smokes (Stoltzfus, 2011).

To test that the social messages statistically are a good fit for the logistic regression model, the Hosmer-Lemeshow goodness of

fit test will be performed after the regression. A P-value greater than 0.050 will represent that the social messages significantly explain the model.

2.8 | Ethical Consideration

The ethical approval for this study was granted by the Institutional Review Board of the Institute of Disaster Management and Vulnerability Studies, University of Dhaka, Bangladesh (ERC//02-2024). Before data collection, the enumerators provided a brief explanation of the study's purpose and obtained written informed consent from the respondents.

TABLE 1 | Demographic Profile of the Respondents.

Descriptive statistics			
Age		Years	
	Average	22	
	Oldest	32	
	Youngest	18	
		N	%
Gender	Male	370	58.5%
	Female	262	41.5%
Marital status	Married	48	7.6%
	Unmarried	584	92.4%
Religion	Islam	562	88.9%
	Hindu	67	10.6%
	Buddhism	1	0.2%
	Christianity	1	0.2%
	Others	1	0.2%
Type of University	Public	400	63.3%
	Private	232	36.7%
Studying year	1st Year	211	33.4%
	2nd Year	87	13.8%
	3rd Year	102	16.1%
	4th Year	87	13.8%
	Masters	144	22.8%
	M Phil	1	0.2%
Faculty	Science	182	28.8%
	Arts	61	9.7%
	Social science	166	26.3%
	Business studies	173	27.4%
	Fine arts	50	7.9%

TABLE 2 | Frequency Distribution of Respondents Experience to Social Messages.

Social messages	Frequency of receiving messages	Tobacco consuming status		
		Current smoker	Never smoked	Quit smoking
Received antismoking messages from media	Never	14%	2%	14%
	Sometimes	39%	44%	38%
	Always	47%	54%	48%
Received antismoking messages from relatives	Never	3%	2%	10%
	Sometimes	33%	32%	20%
	Always	64%	66%	70%
Received antismoking messages from religious institutions	Never	9%	7%	6%
	Sometimes	36%	32%	29%
	Always	55%	61%	65%
Received antismoking messages from peers?	Never	35%	29%	37%
	Sometimes	36%	49%	35%
	Always	29%	22%	29%

3 | Results

Table 1 shows the demographic profile of the surveyed respondents. Here the average age of university students was 22years. In the sample there were slightly more male students than female students (Male: 58.5%, Female: 41.5%). The highest proportion of the students were unmarried (Unmarried: 92.4%). The largest proportion of the students were Muslims (88.9%), and second largest proportion were Hindus (10.6%).

Table 2 depicts the current context of Antismoking social messages encountered by both current and non-smokers. Family members play a pivotal role in conveying Antismoking messages to both current (64%) and non-smokers (66%). Additionally, current smokers reported receiving Antismoking messages from the media (47%) and peers (29%). Conversely, 14% of current smokers indicated they had not encountered any messages from the media, compared to only 2% of non-smokers. In terms of religious institutions, a greater proportion of non-smokers (61%) received messages from these sources, whereas this was true for only 55% of current smokers. Among the students who have quit smoking, it can be seen that they got the highest frequency of Antismoking messages from religious institutions (Always: 65%) and their relatives (Always: 70%). The students who quit smoking had a high proportion, 37% of the students, of no social Antismoking messages from peers.

Table 3 presents the results of the influence of Antismoking messages on subjective norms and attitudes towards smoking. From the table, it can be observed that media messages significantly increase the likelihood of students staying away from smoking, and as the frequency of media messages increases, the likelihood also increases (Messages from Media: Sometimes; OR = 2.010, p -value < 0.050, Always; OR = 2.725, p -value < 0.010).

Sometimes, getting Antismoking messages from parents did not have a significant effect on the intention to smoke. However, frequent messages increase the likelihood of avoiding smoking (OR = 3.781, p -value < 0.010). Messages from religious institutions significantly increase the likelihood of university students refraining from smoking and the likelihood more if the message frequency increases (Messages from Religious Institutions: Sometimes; OR = 2.504, p -value < 0.050, Always; OR = 4.921, p -value < 0.010). Frequently getting Antismoking messages from peers significantly improves the odds of students not engaging in smoking (OR = 2.266, p -value < 0.050). Similar to the intention of students refraining from smoking, students' attitudes toward quitting smoking also increase as they get more Antismoking messages from the media (Messages from Media: Sometimes; OR = 1.921, p -value < 0.050, Always; OR = 2.793, p -value < 0.010). Frequent Antismoking messages from parents significantly raise the likelihood of students' confidence in quitting smoking (OR = 2.526, p -value < 0.050). Receiving Antismoking messages from religious institutions significantly increased the attitude of students to quit smoking (Messages from Religious Institutions: Sometimes; OR = 1.872, p -value < 0.100, Always; OR = 3.664, p -value < 0.010). Frequent Antismoking messages from peers significantly enhance the attitude toward quitting smoking (OR = 3.186, p -value < 0.010). Male students were observed to have a lower likelihood of intending to stay away from smoking and a weaker attitude toward quitting smoking (Intend to stay away from Smoking: OR = 0.540, p -value < 0.050; Attitude towards quit smoking: OR = 0.600, p -value < 0.100).

Table 4 depicts that messages from the media had a significant effect on students never smoking but had no statistically significant effect on quitting smoking (OR = 2.500, p < 0.001; OR = 2.118, p < 0.001). Parental guidance diminishes the quit intentions of past smokers (OR = 0.486, p < 0.050) but enhances smoking reduction efforts for never smokers (OR = 2.058, p < 0.001). Frequent messages from religious

TABLE 3 | Influence of Antismoking message on subjective norms and attitudes of the respondent.

Subjective norms and attitudes towards smoking of University students	Students intend to stay away from smoking ^a		Students attitude towards quit smoking ^b	
	Odds Ratio	<i>p</i> value	Odds ratio	<i>p</i> value
Messages from media (Ref: Never)				
Sometimes	2.01 (1.014, 3.982)	< 0.050	1.921 (1.020, 3.616)	< 0.050
Always	2.725 (1.350, 5.502)	< 0.010	2.793 (1.453, 5.368)	< 0.010
Messages from parents (Ref: Never)				
Sometimes	1.173 (0.508, 2.709)	NS	1.041 (0.454, 2.390)	NS
Always	3.781 (1.652, 8.651)	< 0.010	2.526 (1.132, 5.638)	< 0.050
Messages from religious institutions (Ref: Never)				
Sometimes	2.504 (1.186, 5.288)	< 0.050	1.872 (0.906, 3.865)	< 0.100
Always	4.921 (2.386, 10.150)	< 0.001	3.664 (1.816, 7.393)	< 0.001
Messages from peers (Ref: Never)				
Sometimes	0.951 (0.538, 1.683)	NS	1.236 (0.741, 2.060)	NS
Always	2.266 (1.093, 4.699)	< 0.050	3.186 (1.619, 6.269)	< 0.010
Age	1.057 (0.922, 1.212)	NS	0.981 (0.869, 1.107)	NS
Gender (Ref: Female)				
Male	0.54 (0.297, 0.980)	< 0.050	0.6 (0.352, 1.023)	< 0.100
Marital status (Ref: Unmarried)				
Married	1.935 (0.538, 6.957)	NS	0.848 (0.338, 2.131)	NS
Religion (Ref: Non-Muslims)				
Muslims	0.794 (0.328, 1.923)	NS	1.295 (0.617, 2.719)	NS
Type of University (Ref: Public)				
Private	1.791 (0.973, 3.295)	< 0.100	1.429 (0.826, 2.473)	NS
Hosmer–Lemeshow goodness of Fit <i>p</i> value	<i>p</i> -value > 0.100		<i>p</i> -value > 0.100	

Note: The numbers in parentheses represent the 95% confidence interval.

Abbreviation: NS, not significant.

^aTotal Sample Size *N* = 632, Intend to stay away from smoking: 564 Students.

^bTotal Sample Size *N* = 632, perceived confidence of Quit smoking: 548 Students.

institutions increases the likelihood of quitting consumption of cigarettes (OR = 4.607, *p* < 0.100) and also, assist non-smokers in avoiding use (OR = 2.414, *p* < 0.001). For students to quit smoking cigarettes, peer-led cessation messages prove ineffective (OR = 0.659, *p* < 0.100), but they are proven effective for non-smokers (OR = 2.846, *p* < 0.001). Aging contributes to a decrease in tobacco use among non-smokers (OR = 1.042, *p* < 0.050). Compared to females, smoking cessation messages are significantly less effective for males and never smokers, with efficacy reduced to 0.222 and 0.246 times, respectively (OR = 0.222, *p* < 0.010; OR = 0.246, *p* < 0.001). Marital status appears to exert no significant influence on the response to antitobacco messages, suggesting that it does not substantially affect changes in tobacco-related behavior. Muslim past smokers demonstrate notably greater responsiveness to antitobacco messages compared to never smokers (OR = 3.003, *p* < 0.01). Furthermore, cessation messages lead to quitting cigarettes at private universities compared to their peers at public and national universities (OR = 2.054, *p* < 0.05).

4 | Discussion

The smoking behaviors and their rising prevalence among young adults globally present significant obstacles to attaining the vision of a tobacco-free generation [17]. This study focuses on antitobacco messages from diverse sources like media, parents, religious institutions, and peers that influence current and non-smokers, with the aim of promoting tobacco cessation among university students using Theory of Planned Behaviour (TPB). University students are considered one of the most vulnerable groups for smoking due to interconnected factors, including peer group pressure, targeted marketing and easy access, social media influences, and challenges associated with managing mental health issues (such as stress, anxiety, and depression related to academic performance and personal matters), as well as various social issues like home and community influences and societal norms [18–20]. To address these issues, TPB model was utilized to understand the individual's smoking behaviour by three components: subjective norms, attitude toward quitting behaviour, and perceived behavioural control.

TABLE 4 | Influence of antitobacco message on perceived behavioral control of the respondents.

Socio-demographic profile and sources of antitobacco message	Quit smoking ^a		Never smoked ^b	
	Odds Ratio	<i>p</i> value	Odds Ratio	<i>p</i> value
Messages from media (Ref: Never)				
Sometimes	1.018 (0.326, 3.175)	NS	2.500 (1.916, 3.262)	< 0.001
Always	0.557 (0.189, 1.642)	NS	2.118 (1.655, 2.711)	< 0.001
Messages from parents (Ref: Never)				
Sometimes	0.486 (0.272, 0.868)	< 0.050	2.058 (1.477, 2.866)	< 0.001
Always	0.855 (0.604, 1.210)	NS	2.367 (1.925, 2.910)	< 0.001
Messages from religious institutions (Ref: Never)				
Sometimes	0.649 (0.388, 1.084)	< 0.100	2.049 (1.509, 2.783)	< 0.001
Always	4.607 (1.020, 19.387)	< 0.100	2.414 (1.944, 2.997)	< 0.001
Messages from peers (Ref: Never)				
Sometimes	0.659 (0.412, 1.053)	< 0.100	2.425 (1.846, 3.185)	< 0.001
Always	0.857 (0.497, 1.479)	NS	2.846 (2.075, 3.904)	< 0.001
Age	0.991 (0.916, 1.072)	NS	1.042 (1.001, 1.083)	< 0.050
Gender (Ref: Female)				
Male	0.222 (0.092, 0.535)	< 0.010	0.246 (0.161, 0.375)	< 0.001
Marital status (Ref: Unmarried)				
Married	1.826 (0.479, 6.960)	NS	0.984 (0.472, 2.050)	NS
Religion (Ref: Non-Muslims)				
Muslims	3.003 (0.972, 9.271)	< 0.100	1.556 (0.884, 2.738)	NS
Type of University (Ref: Public)				
Private	2.054 (0.999, 4.221)	< 0.100	1.203 (0.806, 1.796)	NS
Hosmer–Lemeshow goodness of Fit <i>p</i> value	<i>p</i> -value > 0.100		<i>p</i> -value > 0.100	

Note: The numbers in parentheses represent the 95% confidence interval.

Abbreviation: NS, Not significant.

^aTotal sample size *N* = 191, Quit Smoking: 84 Students.

^bTotal sample size *N* = 632, Never Smoked: 441 Students.

Subjective norms represent individuals' perception of social pressures like Antismoking campaigns and messages influence them to avoid the behaviour. For instance, smoking is socially unacceptable, and many people disapprove of smoking that reshapes the individuals perceived norms. The study has found that Antismoking messages received both sometimes and always from the media strongly influence the current smoker's behavioral intention to stay away from smoking. In addition, the current smokers who receive Antismoking messages from parents are around four times more likely to intend to stay away from smoking compared to non-smokers. Furthermore, religious institutions and peer groups significantly influenced the students to develop a habit of staying away from smoking. Numerous studies support these findings, indicating that media, family and peer pressure, cultural values surrounding smoking, and religious beliefs all reinforce the development of a habit to intend the evasion of smoking [21, 22]. Moreover, private university students are more than one times more influenced compared to students of public universities, deterring smoking by Antismoking messages from different sources where age, marital status, and religion didn't create any effect of smoking.

The attitude toward quitting smoking of current smokers by influencing different Antismoking messages—highlighting negative consequences of smoking through showing statistical data of health risk, graphic imagery (different types of cancers, respiratory illnesses) from social media, peer groups, and religious institutions. The study found that current smokers who received Antismoking messages both sometimes and always from social media were reinforced to increase their positive attitude toward quitting smoking. The previous literature has found a strong relationship between Antismoking advertising campaigns and cessation of smoking among young people [23]. Furthermore, the smokers who received Antismoking messages, always from religious institutions, peer groups, and parents, showed increased confidence in quitting smoking. These findings align with the literature, suggesting that peer groups and social media significantly increased the attitude of young adults and adolescents to quit smoking [24]. In contrast, the development of a positive attitude toward quitting smoking didn't find any association in terms of gender, age, marital status, and among public and private students.

For perceived behavioural control on quitting smoking between non-smokers and current smokers have found different associations by influence of antitobacco messages from different sources peer group, social media, and parents through informational and motivational mechanisms. The Antismoking messages highly influenced the perceived behaviour control of smokers depending on source credibility, message content, emotional tone, and social reinforcement [25]. The study has found that current smokers and non-smokers' behavior is controlled to quit smoking by receiving Antismoking messages from social media and parents, but the possibilities are comparatively high among non-smokers. On the other hand, the religious institutions didn't find any significant relationship for current smokers, whereas non-smokers found a strong relationship and more than two times higher compared to current smokers. The findings align with literature indicating significant relationships between religious institutions and smoking cessation among smokers [26]. The study showed peers, groups, and parents have played significant roles for nonsmoker students by sending Antismoking messages to control their behavior from taking tobacco, while current smokers didn't find any significant association. Croghan [26] discovered that peer group pressure, family support roles, and educational institutions have a strong association with smoking cessation among university students. Moreover, females are highly influenced by Antismoking messages compared to males among current smokers for behavioral intention to evade smoking. In contrast, literature supports the findings that female smokers exhibit more ambivalence toward quitting smoking compared to their male counterparts [27]. However, students from private universities consume tobacco twice as often as those from public and national universities in Bangladesh. Antismoking or cessation messages lead to a reduction in tobacco consumption among non-smokers. A study [28] reported similar findings in their study. Moreover, the marital status of the respondents does not significantly impact tobacco usage or smoking cessation among current and non-smokers.

5 | Conclusion

The antitobacco or cessation messages have played a pivotal role among university students in shaping their attitudes and behaviors toward quitting tobacco use. The study discovered that antismoking messages from parents and peer groups have a positive impact on students' behavioural intention to stay away from tobacco use. Moreover, the study identified certain anti-smoking messages (specifically, those from parents, peers, media, and religious institutions) that inadvertently contribute to develop positive habits to quit smoking among non-smokers compared to current smokers. However, the study didn't go beyond its limitations. This study solely relied on a quantitative research approach, which restricts our ability to explore the social, cultural, and personal nuances underlying students' attitudes and behaviors toward tobacco use. Other than that, some other crucial limitations are the use of self-reported data, and the limited generalizability of a university-based sample. Due to time and funding constrains researchers could not eliminate such probabilities. Yet it tried to grasp the reality in the present day for the university students on their perception

on tobacco products consumption. Therefore, this finding should serve as a catalyst for policy-making debates aimed at re-innovating antismoking messages to encourage university students in Bangladesh to quit smoking.

Author Contributions

Maruf Hasan Rumi: conceptualization, methodology, project administration, writing – original draft, writing – review and editing, supervision. **Sayed Jubair Bin Hossain:** methodology, software, data curation, formal analysis, writing – review and editing, visualization, validation. **Adila Reza Hasan:** conceptualization, funding acquisition, investigation, writing – original draft, writing – review and editing. **Md Abu Sayem:** writing – original draft, writing – review and editing.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. Data will be made available on request.

Transparency Statement

The lead author, Maruf Hasan Rumi, affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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